



The Daedalean

Semper Discens

*Monthly Aerospace Education Publication of the
Connecticut Wing of the Civil Air Patrol*

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The Daedalean is temporarily serving as the CTWG news periodical. We are searching for a new CTWG PAO Officer who will accept the responsibilities of the office. We also would appreciate any suggestions for a title for a new CTWG newsletter or magazine. In the interim, squadron PAOs should send items of interest to srocketto@aquilasys.com.

SCHEDULE

09-10 OCT-CTWG Unit Commander's Course
19 OCT-CTWG Field Trip-Intrepid Museum
26-27 OCT-TLC Course-Camp Niantic
26 OCT-Cadet Rifle Safety and Marksmanship
09-10 NOV-UCC Course-Camp Niantic
16 NOV-Cadet Rifle Safety and Marksmanship

SQUADRON AEROSPACE NEWS

New Haven Minutemen
submitted by
Maj Paul Noniewicz

Cadets Brophy, Lucibello, and Dymarczyk participated in orientation flights on 14 September. Maj Paul Noniewicz of Thames River served as a pilot on the New Haven-Groton missions.

186th Composite Squadron-Plainville
submitted by
Maj David Hernandez

The Squadron has completed the Redstone Phase of the Rocketry Program and is now engaged in working on the Titan Phase. Maj Kenneth Conrad is directing the program.

Silver City Cadet Squadron-Meriden
submitted by
Capt Oran Mills & Capt Robert McGuire

Capt Mills met with the North Branford Boys Scout Troop on Thursday, the 19th of September. Mills briefed the scouts on the requirements which must be met to earn the Aviation Merit Badge.

The briefing covered topics as basic as the four forces of flight and as advanced as the differences between low and high by-pass turbines. Video clips and white board sketches were extensively used to present the varied topics.

The highlight of the evening was the demonstration and hands-on use of a Meriden wind tunnel. Scouts were allowed to manipulate the air foil section in the tunnel, varying the angle of attack and observing the behavior of the attached threads as they reacted to the changing airflow.

Capt Mills will work with the scouts as they complete their workbooks and submit the paperwork for the badge.

The scouts have been invited to attend a regular meeting of the Silver City Squadron where they will meet cadets, be introduced to the Cessna 172, and be taken through the steps of a pre-flight inspection.

On Friday August 30th, members of the Meriden squad got a tour of the Bradley Terminal Radar Approach Control (TRACON) and tower facilities. While at the TRACON, they were shown the new radar display system that blend radar returns from several sites simultaneously giving the appearance of continuous tracking. They learned how

clearances were delivered and how traffic is passed from sector to sector.

The tower visit provided information on how traffic is handled on the ground, sequenced for flight, and handed off to the air traffic control center.

Royal Charter Squadron-Hartford

The Royals held an open house at Brainard Airport on Saturday, September 21st.

The Experimental Aircraft Association allowed the squadron to board their Boeing B-17, "Aluminum Overcast" and the treated Lt April Krason and her Fidelco guide dog, Paco, to a flight. Paco has served as the Royal Charter mascot for the past year and has just left to under eight months of guide dog training.



Lt Krason, Paco, and Mr. Sam Bass, the EAA pilot of "the Aluminum Overcast."

The Royals will take part in the Wreaths Across America on December 14th and provide a color guard and wreath bearers.

The Royals will be running a fund raiser and selling chocolate during October and November. Contact Maj Murphy (hlmurphy@cox.net) or Lt Krason (abkrason@hotmail.com) to place an order which will be delivered in time for the holidays.

Stratford Eagles *submitted by* *Capt Kenneth Fortes*

The Stratford Eagle (CT-022) Color Guard was called into action to support a black tie event at Igor Sikorsky Memorial Airport. Black Horse for Heroes, a non-profit organization created to assist

veterans affected by Post Traumatic Stress Disorder hosted the gathering.

Based on a ranch in Bethany, CT, Black Horse reaches out veterans through equine therapy: the use of horses as a psychological and emotional medium.

Stratford's C/CMSgt John Mulcahy organized a team of cadets to act as color guard and flag bearer for the "Empty Chair Ceremony." Participating were C/SMSgt Elias M Bou-Chahine, C/SrA Nathaniel Nunez, C/Amn Aaron Baur as color guard, with C/Amn Facundo Cremel as flag bearer.



Stratford Cadets in front of invasion striped C-47

Stratford officers in attendance were Lt. James Riccio, Color Guard Coach, Lt. Sharon Riccio, Logistics; and Capt. Kenneth Fortes.

A Czech Aero Vodochodny L-39 Albatross and a Polish M-26 Airwolf performed fly-bys for the 500 spectators at the event supporting injured US veterans.

399th Composite Squadron-Danbury

submitted by
LtCol Sandy Sanderson & SM Brian Waldron

Danbury cadets are assisting members of the Experimental Aircraft Association in the construction of a Pietenpol Air Camper.

Designed by Bernard Pietenpol, the plane was envisioned as a simple, cheap and easy to construct home-built.

The construction is in its second year with two more years expected before completion. The wing structure has been assembled and are awaiting

gluing. The power plant will be a Corvair engine, favored over the traditional one salvaged from a Ford Model A. Some thirty different engines have been used in Air Campers since first flight in 1928.



*An Air Camper
on display at
the Hiller
Aviation
Museum.*

Thames River Composite Squadron-Groton

*submitted by
SM Douglas Corrigan*

The Squadron flew eight cadets in four sorties over the 7th and 8th of September. On Friday, Captain Farley flew three trips. Cadets Don and Michael Hollingsworth completed the first Syllabus Lesson #6 on a round trip to Willimantic. Cadet Poe also flew on a #6 lesson to Meriden accompanied by Cadet O'Toole who completed lesson #9. The last Saturday flight was another Willimantic hop with Cadet Johnstone doing lesson #9 and Cadet Conway completing lesson #6.

During the full moon period, LtCol Rocketto set up a 125 telescope. Prominent features which were studied were the mares, Tycho Crater and its ray pattern, and the mountains along the edge of the disc.

On the 29th, former cadet Timothy Plourde spoke to his cadets about his University of Connecticut experience in USAF ROTC. Plourde graduated with a degree in material sciences, has been commissioned a second lieutenant, and will be stationed in Japan as a civil engineer.

The Thames River Composite Squadron will be running their annual citrus fruit fund raiser in October and early September. Navel oranges and pink grapefruit or mixes of both fruits in 20 and 40 pound boxes will be available and delivered in

early December. Contact LtCol Rocketto at srocketto@aquilasys.com if you wish more information.

Six Squadrons at Simsbury Fly-In

*submitted by
Capt Lenny Kimball*

The annual Simsbury Fly-In and Airshow was held on 15 September at Simsbury Airport. Hartford's Royal Charter, the 169th out of Manchester, Northwest Hills, the Stratford Eagles, East Granby's 103rd, and 186th based at Robertson Airport were represented by cadets and officers.



Some of the CTWG Participants at Simsbury

The National Operations Center issued a mission number and both flight line marshaling and mission pilot training was accomplished as well as recruitment. Some 700 aircraft were parked.



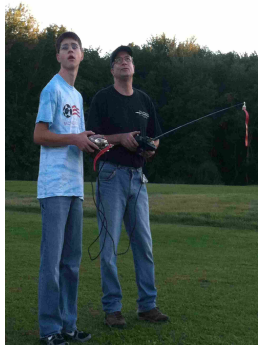
*CAP members marshal a Cessna 175 on
amphibious floats. (Photos by Lennie Kimball)*

AEROSPACE EDUCATION THROUGH RADIO CONTROL FLIGHT

by

*1st Lt. Ronald Hocutt, Aerospace Education
Officer
103rd Composite Squadron*

In the world of a typical Civil Air Patrol cadet many mistakes can be erased just by pressing the reset button. Building and flying radio controlled (RC) aircraft offers a distinctly different experience. This experience teaches the fundamentals of flight in a way that no other activity can, including flying full scale aircraft.



*C/TSGT Dominic Sogliuzzo
and 1st Lt. Ronald Hocutt on
the "box" for Cadet
Sogliuzzo's maiden flight*

To encourage our cadets to interact real-time with the 3 dimensional world we live in, the 103rd composite squadron out of Windsor Locks set themselves the task of repairing and flying a pair of donated RC aircraft. The first step in the process was to educate cadets. These planes were not "toys," but were real airplanes in every sense of the word. They had the same 3-axis control system. They were powered by the same internal combustion engines, subject to the same problems such as carburetor icing, pressurized fuel systems, and vibration, and had to obey the same laws of flight as full scale aircraft. In the movie *The Flight of the Phoenix*, an aeronautical engineer asserts that designing scale model aircraft is much more difficult than a full scale vehicle as there is no pilot on board to make any necessary corrections. The 103rd set out to test this premise in three distinct phases to see if this assertion is true.

Phase 1 – Resurrecting The Planes

The planes in question had definitely seen better days. With an ever-present eye to safety, the cadets were tasked with repairing multiple systems: control, airframes, engines, and radios. In the process they learned about many different aeronautical topics such as how an internal combustion engine works, how a plane delivers fuel to the engine while inverted, and how control surfaces are engineered to give control around the 3 axis of flight.



C/Maj Hocutt and one of the refurbished aircraft.

Phase 2 – Balancing, Control Check, and Pre-Flight Checklists

As every pilot knows, the devil is in the details. After bringing our donated planes back to life and making them airworthy, the squadron spent several AE classes on the finer points that would enable them to fly well.

This included balancing the aircraft to assure that its center of gravity and center of lift were "in the envelope," ensuring that the control system was set up properly so that "up" elevator on the transmitter commanded "up" elevator on the plane, and going through a complete flight checklist prior to flight. Both full scale and scale model pilots will attest to the importance of this phase, so significant time was spent here.

Phase 3 – Flight

With airworthy planes trimmed, balanced, and ready for flight, the 103rd went to the flying field. Our flying field is graciously provided by the

Northern Connecticut Radio Control Club (www.NCRCC.org) in Ellington Ct. We joined the American Modelers Association (AMA) and joined NCRCC. We received flying privileges after a “check flight” to ensure that our dusty flying skills were intact. After the appropriate safety briefings, six cadets to have received instruction from an experienced RC flyer using a “buddy box.” A buddy box is a dual control unit which allows the instructor to override serious mistakes by the student.

The instructor gets the plane up to altitude and then turns control over to the cadet. If at any point the cadet gets into trouble, the trainer can take control back instantly and brings the plane back to straight and level flight. So far the consensus among cadets is that flying a scale model aircraft isn’t nearly as easy as it looks, with the knowledge that there is no “reset” button adding additional excitement to the task. So far, both planes have survived to fly again and the cadets are getting valuable, exciting AE education.

WING AEROSPACE EDUCATION OFFICER POSITION OPEN

The position of External Aerospace Education Officer is open to a qualified applicant. The applicant will be expected to complete duties assigned by the Wing Aerospace Education Officer. The candidate must

- Complete the Yeager Award or be working on completing it.
- Enroll in the AEO 215 Specialty Track or have completed it.

Duties may include the following:

- Direct the external aerospace education program.
- Recruit Aerospace Education Members (AEM) into CAP.
- Support AEMs with visits to their classrooms and by conducting aerospace education activities.
- Encourage AEMs to participate in the voluntary Aerospace Education Excellence Program.
- Encourage AEMs and other CAP teacher members to participate in the Fly-a-Teacher Program.
- Promote and assist with aerospace education projects such as workshops and seminars.

- Promote CAP aerospace education programs and educational materials in schools.
- Promote CAP’s external AE mission to the regular uniformed CAP members.
- Establish and maintain contact with educational agencies promoting CAP AE products.
- Present AE lessons and activities in many different educational settings.

Contact LtCol Stephen M. Rocketto, Director of Aerospace Education, CTWG (srocketto@aquilasys.com) if you have questions.

MORE WING STAFF POSTIONS OPEN

In addition to the opening in AE, the following postings are also available: Information Technology, Webmaster, Recruiting and Retention, Testing Officer, and a committee chair for grant writing and fund raising.

If you are interested, contact the Chief of Staff, Maj James Ridley at: jridley3@optonline.net.

“WOMEN TAKE FLIGHT” STAFFING NEEDED

Maj April Krason is calling for volunteers to help man the CAP booth at the ninth annual “Women Take Flight” day at the New England Air Museum. The event will be held on Sunday, November 3rd.

Stations will be established throughout the Museum and will be manned by women who have either made careers in aerospace or made their mark by means of noteworthy achievements. Visitors will be encouraged to stop at the various booths and speak to them about opportunities for women in aerospace.

Bee Haydu, a member of the Women Air Force Service Pilot (WASP) which served during World War II will be present. A number of women military pilots, aeronautical engineers, and commercial and industrial pilots will make up the balance of twenty talented ladies which young girls and old men might meet, speak to, and learn something.

Anyone interested in serving in the CAP

information and recruiting booth should contact Maj April Krason at: abkrason@hotmail.com

CTWG PILOT MEETING

*submitted by
Capt Robert McGuire*

Wing pilots convened at Meriden-Markham on Saturday, 21 September for the academic session of G1000 introduction now required by CAP for G1000 qualification. Capts Oran Mills and Robert McGuire and LtCol Sandy Sanderson were the presenters.

Over two dozen pilots attended and benefited from the class and enjoyed the refreshments provided by Capts Roger Malagutti and Johnny Burke.

SIKORSKY AIRPORT DEDICATED AS HISTORIC AEROSPACE

Bridgeport's Sikorsky Memorial Airport was named an Historic Aerospace Site by the American Institute of Aeronautics and Astronautics (AIAA). A ceremony was held on 27 September in the Volo Aviation Hangar. The CTWG was represented by Capt Kenneth Fortes, Stratford Eagles, Mr. Stuart Sharack, Aerospace Education Member for southeastern Connecticut, and LtCol Stephen Rocketto, CTWG Director of Aerospace Education. Rocketto also represented the Hartford Section of the AIAA where he serves as a board member.



AIAA Representatives at Sikorsky: Emily Springer, AIAA Historic Sites Program, LtCol Rocketto, Dr. Ferdinand Grosveld, AIAA NE Region Director, and Stu Sharack.

Mr. Michael Hirschberg served as master of ceremonies. Hirschberg is Executive Director of American Helicopter Society International (AHSI), the non-profit society for those working in the rotorcraft industry. AHSI partnered with AIAA in sponsoring the event.

Mr. Hirschberg noted that within feet, not miles of where we sat, Igor flew the revolutionary VS-300, the first successful single rotor equipped with an anti-torque tail rotor. The XR-4, prototype for the first mass produced helicopter and the first helicopter to serve in combat and to effect a rescue, was also developed and tested at Bridgeport.



A representation of the statement on the bronze plaque which will be installed at Sikorsky Memorial Airport.

Remarks on Sikorsky were also presented by Mr. Dan Libertino, President of the Igor I. Sikorsky Historical Archives, Mark Hammond, Senior Manager of the Advanced Programs at Sikorsky, Ferdinand Grosveld, Director AIAA North East Region, and Nicolai Sikorsky, one of Igor's sons.

Mr. Hammond commented on recent developments, the work in progress on the S-97 Raider, an entry in the competition for the next US Army "Armed Aerial Scout." The Raider is based on the recently tested X-2. He also noted that the company is looking to the future and focusing on speed, autonomy, and intelligent self-monitoring helicopter systems.



Nicolai Sikorsky and Mark Hammond pose in front of a model of the VS-300.

Mr Nicolai Sikorsky told a number of interesting anecdotes about his father. One of the most telling stories involved an incident in which Igor was praised for conquering the laws of flight. Igor's rejoinder was that he "had spent his whole life learning how to obey them!"

The ceremony concluded with the unveiling of a plaque commemorating the historical importance of the airport.

SEPTEMBER RIFLE SAFETY AND MARKSMANSHIP PROGRAM REPORT

Twelve cadets from two squadrons met at the Quaker Hill R&G Club on the 28th to learn about rifle safety and earn Winchester-NRA medals. The cadets represented Danbury's 399th Composite Squadron and Groton's Thames River Composite Squadron.

After a safety briefing and instruction in the prone position, sling adjustment, breathing, and trigger control, the cadets fired five relays from the prone position. Each relay consisted of 25 shots fired at 50 yards on the A-23 target.

Every new shooter qualified at the marksman level. Two advanced shooter completed targets for sharpshooter and sharpshooter bar nine.



Cadet and coaches gather after last relay for group photo. (photo by SM Waldron)

The Danbury cadets were accompanied by LtCol Sandy Sanderson who also served as an instructor assisted by Capt Greg Sweeney. SM Brian Waldron drove and served as photographer.

The cadets from Danbury were C/SSgt David Nolan and C/SrA Noah Stillman and Joseph Waldron.

The Groton Cadets were led by Lt David Meers. They were C/Bs Vitya Conway and Chris Jaskiewicz, C/Amn Daniel Hollingsworth, Michael Hollingsworth, and Virginia Poe, C/A1C Aston Foley, and C/MSgt Matthew Johnson, all of whom qualified as Marksmen. C/SSgt John Meers added three targets to his Sharpshooter stage qualification and C/CMSgt Keith Trotochaud added three targets towards Sharpshooter Bar 9.

2dLt Timothy Plourde, USAF, a former TRCS cadet and Montville High School Rifle Team member, who earned the NRA Distinguished Expert and Hap Rocketto, a national record holder, formerly of the US National Guard Rifle Team, also served as instructors and scorers.

LtCol Stephen Rocketto was Chief Range Officer and Lead Instructor.

The article following states the dates and details of the next Cadet Rifle and Safety Marksmanship event.

**CADET RIFLE SAFETY AND
MARKSMANSHIP PROGRAM**

Date: Saturdays, October 26, November 16.

Time: 0800-1500

Place: Quaker Hill Rod and Gun Club, Oxoboxo Dam Rd., Oakdale, Ct.

Uniform: BDUs

Paperwork: Each cadet should submit a Form 161 and a copy of the CAP Rifle Waiver (attached). The senior officer from each squadron is responsible for collecting and maintaining these documents..

Equipment and Supplies: All necessary equipment, targets, and ammunition will be supplied. Participants should bring hearing protection and safety glasses if they own them. If not, they will be provided. Prescription glasses are equivalent to safety glasses.

Firing Plan: Cadets will fire in alternate relays of 15 each at a range of 50 yards. Twenty five shots will be fired in each half hour relay.

Cost: free-supported by Connecticut Friends of the NRA and the Quaker Hill Rod and Gun Club

Squadrons must supply their own transportation.

The firing line is protected by an overhead shelter but heavy rain may prevent outdoor firing. If this occurs, we will move to the indoor 50 foot range.

Cadets who participate may qualify for NRA medals which they can wear with their blues.

In order to give all squadrons and cadets an equal chance to participate, the following guidelines are established:

A session can accommodate 30 cadets, 15 shooting on alternate relays.

Preregistration is required.

October 26 (cut-off date is 12 October)
November 16 (cut-off date is 02 November)

Participation is on a first come, first serve basis.

Send your reservations and approximate number of attendees to srocketto@aquilasys.com.

NASA INTERNSHIPS

Maj Robert Rothenbert of the 399th Composite Squadron reports that the National Aeronautics and Space Administration is offering a number of internships in 201 and CAP members are eligible for many of them. This is part of the NASA initiative to increase the number of students in science, technology, engineering, and mathematics.

The program is open to high school students, rising high school students (a high school student who has been accepted to an accredited institution of higher learning, i.e., a college or university, at the time of the internship), and university students up to the doctoral level.

Applicants must be U.S. citizens, with a minimum GPA of 2.8 for college and 3.0 for high school. High school students must be at least sixteen years old at the time the internship begins.

Summer 2014 internships run from early June until early August for college students and from late June until early August for high school students. All student interns get paid.

Applications open on 01 November, 2013 and close on 14 March, 2014. Early application is encouraged. To apply, register for an account at the One Stop Shopping Initiative (OSSI), NASA Internships, Fellowships, and Scholarships (NIFS) at: <http://intern.nasa.gov/>.

For further information, contact:

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NASA/GSFC Mailstop 160, Bldg. 28, Rm. N165,
Greenbelt, MD 20771
E-mail: kenneth.a.silberman@nasa.gov.

QUALITY CADET UNIT AWARD

Col Kenneth Chapman, Wing Commander, encourages every squadron to meet the standards which earn a Quality Cadet Unit Award. The new award cycle is underway and it ends in September of 2014. Every unit with 10 cadets or more is eligible to enter. To qualify, a squadron must meet five of the following nine criteria:

- 1. Adult Leadership:** Unit has at least 3 Training Leaders of Cadets graduates on its roster
- 2. Aerospace:** Unit earned the Aerospace Excellence Award (AEX) during the year
- 3. Cadet Achievement:** 40% of cadets on roster have attained the Wright Brothers Award
- 4. DDR Participation:** 20% of cadets on roster have completed DDRx or unit participated in RRLA
- 5. Encampment:** 50% of cadets on roster have completed encampment
- 6. Enrollment:** Unit has at least 35 cadets listed on its roster
- 7. Growth:** Unit's cadet roster increased by 10%, or 10 cadets
- 8. Orientation Flights:** 60% of cadets on roster have participated in at least 1 flight
- 9. Retention:** Each unit must retain 40% or its members from the previous year.

A complete description of the program may be found at:

http://www.capmembers.com/cadet_programs/library/quality-cadet-unit-award/

In 2012-2013, three CTWG squadrons earned the award: the Stratford Eagles, the 399th Composite Squadron and the 186th Composite Squadron.

THE AEX AWARD

One criterion for earning the Quality Cadet Unit Award is to earn the Aerospace Excellence Award (AEX).

The program requires a squadron to complete six aerospace activities or science/technology/engineering/mathematics activities

from one of the AEX manuals or supplementary CAP manuals such as Robotics or Radio Controlled Aircraft or Astronomy. Then engage in a two hour activity such as a rocket launch or field trip.

AEX is a first class enrichment program for any squadron. The cycle for this award has just started so squadrons have a year to qualify, apply, and receive a handsome award plaque.

During the last year, the following CTWG squadrons earned the AEX Award: the Stratford Eagles, the 169th Composite Squadron, Northwest Hills, Thames River Composite Squadron, New Fairfield 801 and New Fairfield 802 and the 143 Composite Squadron.

For further information, go to:

http://members.gocivilairpatrol.com/aerospace_education/internal_specific/

THE YEAGER AWARD



CAP has three missions; Emergency Services, Cadet Programs, and Aerospace Education. One of these missions, Aerospace Education, is a duty of every member. Whether it be personal, internal to CAP, or external, promulgating the message of aerospace to the greater community, each member ought to be engaged.

Earning the Yeager Ribbon requires that an officer take a 100 question open-book test based upon material in the book, *Aerospace (The Journey of Flight)*. The book is available on-line and in many squadron libraries. It's 26 chapters parallels the cadet six volume *Aerospace Dimensions* and covers topics in aviation history, general and commercial aviation, astronomy, space exploration, meteorology, and the physics of flight.

At last count, sixteen CTWG officers earned the award in the last year and 47% of our officers hold the award.

For further information, go to:

http://members.gocivilairpatrol.com/aerospace_education/awards/yeager-award/

LONG DISTANCE FLYER SPOTTED AT GON

On Sunday last, when the Long Island Sound Patrol landed, they gratefully disembarked and stretched their cramped legs after the tedious three hour, 300 nautical mile mission. We noted three other flyers on the ramp following a similar regime.

There were what appeared to be three American Golden Plovers walking around the general aviation ramp area, a male, a female, and a juvenile.



Two Plovers on the Ramp

The Golden Plover is one of the fastest shore birds, attaining up to 60 mph in flight. It breeds in the Alaskan and Canadian tundra and then makes an extraordinary migratory flight. It flies south by traveling off-shore of eastern North America, crosses the Caribbean, and winters in the savannahs of South America, some ranging as far south as Patagonia.

These three visitors may have been carried ashore by some recent heavy weather.

During their migration, Plovers might land in relatively flat areas such as prairies, on shorelines, or at airports.

Their return journey passes through mid North

America. This round trip can be as long as 25,000 miles with some 2,500 miles over water without rest!

Consider the overwater portion. A rough guide for the best range in a light aircraft might be to use half the maximum speed which is close to the best gliding speed. The Plover has high aspect ratio wings and a conservative estimate leads one to conclude that it attains this speed at around 30 mph. Assume this cruise speed. If so, the non-stop overwater portion of the flight takes about 80 hours or three and a half days! This endurance and range is assisted by the formation flying of the Plover, something forbidden by CAPR 60-1.

Moreover, at the end of the overwater voyage, the bird lands with 10% of its fuel, body fat, in reserve. This is about enough to allow it to fly for about 12 hours more. This is a 15% reserve. A CAP C182 fueled to the tabs and carrying 64 gallons, is required to land with one hour's fuel on board. This is very close to the same 15% reserve of the Plover so the bird does adhere to CAPR 60-1 2-3(j). We shall not mention duty hours.

Their navigation is also amazing. The birds fly out of sight of land, encounter variable winds, and in the case of juveniles, which leave after the adults, make the trip for the first time! The G1000 GPS pales in comparison to the avian genes which govern bird navigation.

So let us not complain about the duration of a LISP mission where all we do is flap our lips and partake of the provender and water which we choose to take aboard with us. The Plover flaps its wings at 50 beats/minute and carries his 2.5 ounces of fuel as body fat.

Incidentally, some historians believe that the American Golden Plover and Eskimo Curlew, often seen in company, may have been the shorebirds sighted by Columbus, two months out from Spain, on his first voyage in 1492. A review of the distance Columbus traveled, about 2,500 nmi, and the average speed of a caravel, about 4 kt, would put his ships around longitude 65 degrees west, just about on the flyway followed by the Golden Plover on its southward migration.

FREE MAGAZINES

Each month, the Aerospace Education Department places a varied collection of pertinent and current magazines on the table outside of the main office and to the left of the restroom door at headquarters. Squadron commanders are urged to take some of these back to their units for distribution of cadets and officers.

The magazines include *Aviation Week and Space Technology*, *Flying*, *Air Force*, *US Naval Institute Proceedings*, *Naval history*, *AOPA Pilot*, and the *Sport Aviation*, *Air Force Magazine*, and *Smithsonian Air and Space Magazine* to name just a few.

WRITING AN AWARD NOMINATION LETTER

Each year, squadron members should consider nominating a fellow officer or cadet for a CTWG or national CAP award. These awards are offered for practitioners in almost all specialty tracks. Some are categorized as “officer of the year.” Others are for lifetime achievement. Others might be for extraordinary performance. They can be for an individual or for a unit. Whatever they might be for, they require a nomination letter.

CAP encourages this program. Members are volunteers and a plaque, a certificate, a medal or a ribbon are meaningful recognitions or achievement or special services, a way of saying “thanks” or congratulations.

A good letter of nomination has three parts: the opening statement, a description of the meritorious act or performance which should include specific examples, and a closing statement.

The nomination must be submitted on the appropriate form and before the date on which nominations close.

CAP has produced an on-line document which covers this process in great detail, provides suggestions as to proper phraseology, and suggests ways to improve a nomination. This document is available at:

http://members.gocivilairpatrol.com/media/cms/P039_003_F66823F4021E0.pdf

Get it, read it, and start thinking about whom you wish to nominate in the upcoming award cycle.

AEROSPACE CURRENT EVENTS

Private Initiatives Funded by Sikorsky and Cessna and an Upgraded F/A-18E/F Offered by Boeing

Both Sikorsky and Cessna are funding military aircraft developments with the hope that government contracts may develop. This can be a risky procedure as Northrop learned with its F-20 Tigershark. In 1975, Northrop built the Tigershark hoping that its simple design, relatively low cost, and high performance would appeal to foreign air forces.

However, the design was competing with the General Dynamics F-16 and the USAF not only was uninterested in the lower technology Tigershark but saw it as a competitor for sales for the favored F-16. Competition would result in a lower production rate for the F-16 and higher prices so political pressures eventually ended the project at a cost of 1.6 billion dollars to Northrop.

The Raider

Sikorsky has started final assembly of its S-97 Raider helicopter prototype which will compete for selection as the US Army's “Armed Aerial Scout.” The aircraft is based on the X-2 technology but will be a significantly larger machine capable of carrying a fire team and equipment or adaptable to reconnaissance roles.



Sikorsky Drawing of the Proposed Raider

The Army has specified performance demands of a 220 knot cruise, 3G turns, and a hover at 10,000 feet at 95 degree Fahrenheit. During a survey in 2012, the Army visited Augusta-Westland, Boeing, Bell, and EADS but found no aircraft that could meet these specifications.

The project is extremely risky given the budgetary problems and competitive designs.

Set to replace the Bell OH-58 Kiowa, the “Armed Aerial Scout” will be a “plum” contact with long-term sales. Sikorsky is hoping, like Little Jack Horner, to stick in their thumb and pull out the “plum.”

The Scorpion

Cessna has also decided to take risks and formed a new division to develop a low cost jet multi-role aircraft which they believe might have some competitive possibilities with the F-35 Joint Strike Fighter and a swarm of turbo-prop attack aircraft: the Embraer A-29 Super Tucano, Beech's AT-6 Texan II, the Ayres V-1-A Vigilant, and Air Tractor's AT-802U



Cessna-Textron Visualization of The Scorpio

Cessna is banking on the restricted military budgets of many nations and its own ability to produce an all-round versatile aircraft which is adaptable to many roles from counter-insurgency to ground attack to intelligence, surveillance, and reconnaissance.

The aircraft is powered by two Honeywell TFE 731a and is touted to have an under \$3,000/hour flight cost.

The Hornet Upgrading and Its Complex Ancestral History

Forty years ago, the Northrop YF-17 Cobra lost a fly-off against the General Dynamics F-16 “Fighting Falcon.” The internal struggles within the USAF between the supporters of the McDonnell-Douglas F-15 Eagle and the lightweight fighter adherents were byzantine to say the least but what developed only adds to a strange story.



YF-17 at USS Alabama Museum, Mobile, Alabama

Rejected by the USAF, the US Navy liked the twin engine design of the YF-17 and Northrop teamed with McDonnell-Douglas to produce the F/A-18 Hornet and the follow-up, the F/A-18E/F Super Hornet. The design and acquisition story behind that development involved rather clever budgetary maneuvering by the Navy to get what was essentially a new aircraft under cover of modifying an old design. The unusual designations of the Hornet and Super Hornet are a tip-off.



Legacy Hornet

During this period of time corporate acquisitions occurred which complicate any understanding of which company name ought be attached to the these aircraft.

When Northrop lost the lightweight fighter contract, they formed a strategic alliance with McDonnell-Douglas (a result of a previous merger between the St. Louis firm of McDonnell and Santa Monica's Douglas Aircraft), the firm which produced the F-15, the rival of the F-16.

General Dynamics, the developer of the F-16 sold its aviation interests to Lockheed which then merged with Martin-Marietta to form Lockheed-Martin.

Northrop then purchased Grumman to create the Northrop-Grumman Corporation.

Boeing acquires McDonnell-Douglas, the company which cooperated with Northrop to produce the F/A-18. Now Boeing owns the rights to a successful descendent of Northrop's YF-17 which once lost a competition to the F-16, now a Lockheed-Martin product.

But recall that McDonnell-Douglas, now a part of Boeing, was instrumental in turning the YF-17 into the F/A-18. And of course, Northrop-Grumman is a major player in producing components for the "Boeing" F/A-18 series.

Now, the high cost of new aircraft and the necessity of keeping heritage aircraft flying and up-to-date leads to a proposal by Boeing to upgrade the F/A-18 series. The most obvious upgrade is the addition of conformal fuel tanks and a belly mounted weapons pod, digital displays with touch screen pads, and new engines. The blended fuel tanks and weapons pod reduces the radar signature of the aircraft and extend its range.

As to cost, a new upgraded F/A-18 is estimated to cost one-quarter the price of the 200 million dollar Lockheed-Martin F-35C Joint Strike Fighter (JSF) which the Navy intends to purchase for its carriers. Boeing claims that for 1/10 the price of the F-35, it can upgrade the current Super Hornets. Given the troubled history of the F-35 program, Boeing claims it is offering an interim alternate. But the F/A-18E/F was originally supposed to be a short term replacement for the Grumman F-14 and A-6.

Its versatility and the redesign of the original F/A-18 created a whole new beast which may be around for a long, long time.



The up-graded F/A-18E/F as proposed by Boeing.

(Photo by Boeing)

For Boeing, this could be pay-back. The F-35C, by Lockheed-Martin, won the JSF competition by eliminating Boeing's X-32B.



Boeing X-32B at Patuxent Naval Air Station



The Lockheed-Martin X-35C Lightning II won a fly-off against the Boeing X-32 and went on to be developed as the F-35C.

The ghost of the Northrop YF-17 haunts Lockheed-Martin and its threatened F-35C program, a program which claims ownership of the successful F-16, which once "put paid" to the future of the YF-17.

AVIATION HISTORY

Three Easy Pieces

A Rough History of Unmanned Aerial Vehicles

Colloquially known as drones, unmanned aircraft are sometimes described as unmanned aerial vehicles (UAVs) or remotely piloted vehicle (RPV). They come in a variety of species and sizes. Perhaps the most simple are the U-control and free flight aircraft models flown by aviation enthusiasts. More sophisticated UAVs are radio controlled (R/C) from ground or airborne stations and range from those flown the local hobbyist to those employed by government agencies, and commercial enterprises. Perhaps the most sophisticated of all are the autonomous UAVs which can be pre-programmed for specific missions and even allowed alternative options given certain pre-established conditions.

Most of us have launched UAVs. Paper airplanes, balsa wood gliders, model rockets, and helium filled balloons are all UAVs. One can even bend control surfaces on our heavier than air models or weight the balloons to allow them to follow a flight plan of sorts. Some of us have worked with U-control and R/C aircraft. The most advanced modelers have achieved remarkable flights. A retired metallurgist and life-time modeler, Maynard Hill, legally blind, built TAM-5, *The Spirit of Butts Farm*, the 25th iteration of his original attempt, and flew it from Newfoundland to Ireland.

Piece One

A Father-Son Team and the Inventive Charles Kettering

The first piece of this essay about the history of UAVs goes back a century to 1908 when a brilliant engineer, Dr. Elmer Sperry inventor of the gyrocompass, considered the problems of controlling an aircraft in flight. His gifted son, Lawrence, captivated by the siren call of aviation, built and test flew his first aircraft in 1909. In 1913, Lawrence enrolled in Glenn Curtiss's flying school in Hammondsport, New York and earned FAI License #11. At the age of 20, Lawrence was

the youngest airplane pilot in the United States



Elmer Ambrose Sperry demonstrates a simply gyroscope. His adaption of the gyro led to advanced navigation and stabilization systems for ships and aircraft.

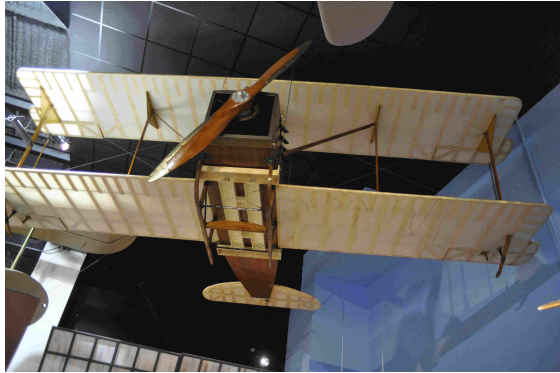


Lawrence Burst Sperry in the cockpit.

Elmer continued the development of his aircraft control system and developed a three axis gyrostabilizer system which in June of 1914, his gifted son, Lawrence Sperry, installed in an aircraft. He then demonstrated what was the first automatic pilot at the *Concours de la Sécurité en Aéroplane* (Airplane Safety Competition) near Paris, France winning a \$10,000 prize.

World War One, the War to End All Wars, broke out in August of 1914. The United States did not enter into hostilities with the Central Powers until

1917 at which time Lawrence founded the Lawrence Sperry Aviation Company in Farmingdale. The first project was the development of an “aerial torpedo,” for the US Navy. Curtiss built five of these flying bombs and they were successfully tested in 1918.



*The Curtiss-Sperry Aerial Torpedo.
Five were built and tested but experimentation
ceased when World War I ended.*

At the same time, Elmer was collaborating with Charles Kettering of Dayton, Ohio. Kettering was another prolific inventor who is credited with the electric cash register, the automobile self-starter, leaded gasoline, and freon. He designed a competing “aerial torpedo” for the US Army. Elmer Sperry designed the stabilization system and Orville Wright was the aeronautical consultant.

Note the rivalries: US Navy vs. US Army, Wright vs. Curtiss, and father vs. son!



*The Kettering Bug never saw combat. It was
designed to carry a bomb load on a certain
azimuth. After a pre-established time, the wings
were released and the bombs would strike
whatever was below. The German V-1 used a
similar system except that engine cut-off,
controlled by a timer, caused its final dive.*

When the Great War ended, so did the development of the two UAVs. However, some research and development continued. Most of that work was still-born. The concepts were too far in advance of the available technology.

But Lawrence Sperry was not idle. Between 1915 and 1923, he had credit for 23 patents including the band and turn indicator and the artificial horizon. He also designed a plane, the Sperry Messenger. He used one of the planes to commute from his home near Prospect Park in Brooklyn to Farmingdale.

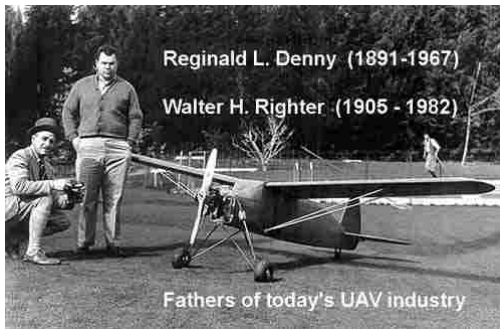
On December 23, 1923, with 4,000 hours logged, the 31 year old inventor left England in one of his Messengers for the short flight to France. It was a foggy day and he never arrived. His body was recovered 19 days later.

Piece Two

*Reginald Denny, Walter Richter, Ronald Reagan,
and Marilyn Monroe*

Not all Hollywood aviation heroes are figments of a screen writer's imagination. Jimmy Stewart flew B-24s with the Eighth AF in Europe. Jackie Coogan flew assault gliders with the First Air Commandos in Burma. Tyrone Power was a USMC transport and patrol plane pilot in the Pacific. Wayne Morris was a US Navy fighter pilot and ace and Gene Autry flew cargo over The Hump. Other actors flew as aircrew. Charlton Heston, Richard Boone, Charles Bronson, Paul Newman, Jack Palance, and Clark Gable to name just a few.

But one Hollywood personality made important contributions in the field of UAVs and his role is little remembered today. Reginald Denny was an English actor, scion of a theatrical family, whose stage and movie career spanned seven decades. During World War I he served as an observer and gunner in the Royal Flying Corps. His interest in aviation paralleled his film career and in the mid 1930s, he formed Reginald Denny Industries and opened up a model plane shop in Hollywood. A consummate craftsman, he was an early member of the Academy of Model Aeronautics and has been installed in the Model Aviation Hall of Fame.



(Photo Courtesy of CTIE, Monash University, & Russell Naughton)

In 1938, Denny teamed up with Walter Richter. Richter had graduated from the California Institute of Technology and had been employed as an engine designer by the Kinner Airplane and Motor Corporation. He became interested in miniature engines and when Denny sponsored a contest for the development of a reliable model engine, Richter entered and won. The engine, branded the Dennymite had a production run of over 10,000.

Around that time, another model hobbyist, a ham radio operator named Kenneth Case, developed a radio control system for model airplanes which he demonstrated to Denny who saw its military applications. The military was interested and was seeking a realistic target to use in training anti-aircraft gunners. Denny, Case, and Richter designed the RP-1, an RC aircraft with a nine foot wingspan and a 2.5 horsepower engine. The test, held at Twentynine Palms, was successful and led to a 1940 contract for the OQ-1 and the birth of the Radioplane Corporation. Five years later, when World War II had ended, Radioplane had produced almost 15,000 drones for the Army and Navy.



A Radioplane OQ-19B aerial target on display at Camp Niantic. Between 1955 and 1958, 10,000 were built for the USAF. The aircraft's designation was later changed to the MQM-33 and it was also known to the Navy as the KD2R Quail.

The Navy, following the Army lead, contracted for thousands of drones which they designated the TDD-1. These were produced in the old Timm Aircraft factory at the nearby Van Nuys Airport where many young women were employed in assembly and parts inspection. The Army's First Motion Picture Unit, stationed at nearby Culver City, was the Army Air Force Unit charged with producing training and propaganda films. The core of the unit were cinema professionals: actors, writers, directors, and camera and prop men. One project was a morale boosting article for *Yank Magazine* which would highlight the role of women in the work force.

The movie actor, Ronald Reagan, now an AAF Captain, sent army photographer David Conover to take pictures of women at work in the Radioplane plant. He spotted the 19 year old Norma Jeane Dougherty and was taken with her beauty. Sensing something special, he took some color photographs and encouraged her to seek a career in modeling. Norma Jeane signed with the Blue Book Agency, bleached her hair blonde, screen tested with 20th Century Fox, and changed her name to Marilyn Monroe. Radioplane had produced a swarm of drones and one queen bee.



One of Conover's "discovery" photos of Marilyn Monroe, taken at the Radioplane factory.

Piece Three A California War Orphan and Three Israelis Buddies Have an Idea

The 1973 Arab-Israeli war, 6-25 October, is known in Arab lands as the Ramadan War and to the Israelis as the Yom Kippur War. It commenced when the forces of Egypt and Syria attacked Israel on Yom Kippur, the holiest day in the Jewish

religion, a day which by a quirk of the lunar calendar occurred during Ramadan, the holy month of the Muslims.

As the Duke of Wellington put it, like Waterloo, it was a near run thing for the over-confident Israelis. The Israeli Defense Force, its command structure near collapse, stumbled to victory thanks to tactical mistakes by their opponents, the tenacious improvised defense and focused counter-attacks by their ground and air forces, and a massive airlift of supplies by the United States.

For the Israelis, one of the most shocking aspects of the war was the horrendous losses which their vaunted air force took when they encountered the Russian supplied missile belt which covered the Egyptian attack. When the war broke out, Israel counted some 400 combat aircraft in their order of battle. When the war ended, they had lost 25% of their strength, almost all of it to the surface-to-air missiles.

After the war, the Israeli Air Force searched for a solution to the problem of how to crack an integrated surface-to-air missile defense system. It took a decade to solve the problem and the UAV played an important role.

The key player in the story of the Israeli development of drones was an American born engineer, Alvin Ellis, an orphan from Los Angeles. Ellis was a US World War II army veteran who fought on Okinawa where he was wounded. After the war, he joined *Machal*, the foreign volunteers who participated in the 1947 Israeli War of Independence. Ellis smuggled refugees and arms and later served in their navy as a frogman.



Al Ellis is right front with three navy comrades.
(Aliyah Bet & Machal Virtual Museum)

He returned to the United States, earned a degree in electrical engineering from UCLA and was employed by Ryan Aircraft where he worked on

the Firebee drone control system. In 1967, he returned to Israel and joined Israel Aircraft Industries (IAI) and participated in the development of the Kfir fighter.

Ellis, like Denny, was a radio controlled model builder. He started a small company with three friends, Ezra Dotan, an Israeli Air force ace, Yehuda Manor, a fellow IAI engineer, and Dr Shlomo Barak, an air force pilot and physicist. They designed an RC model for the sale in the US but market forces caused them to abandon the project. However, in the aftermath of the Yom Kippur War, Ellis envisioned an RC aircraft which could carry a video camera and provide troops with real time intelligence data. In 1974, with the assistance of Nick Zirol, an air frame builder from Smithtown, Long Island and Herbert Adise, an aerodynamicist from Hempstead, Long Island, the partners struggled to produce a viable product. When their employer, IAI showed no interest, they offered the prototype to Tadiran, an Israeli electronics firm, which hired Ellis as a consultant and in 1974, started to produce the Mastiff I at which point Ellis returned to the United States.

In Israel, the Israeli military, which had been impressed by the potential of a cheap source of real time intelligence imagery which put no soldier or airmen at risk started incorporating the UAVs into their battle doctrine. IAI finally saw the opportunities available and produced the Scout. The utility of UAVs expanded as more sophisticated electronics were developed and were integrated into the Israeli order of battle.



A Collection of UAVs at Hatzerim
Front (L-R) Mastiff III (827), Searcher (234),
Middle (L-R): Scout, Oriole (123)
Rear: (L-R): Firebees in the BQM-34 series. 027
carries nine mission marks.

Col Aviem Sella, another ace pilot, realized that the battle to destroy an enemy air defense system required a wide range of resources: good intelligence about the disposition and technical details of the system and the critical evaluation of that information, the ability to jam and spoof the air defense radars, a central command capable of assessing the myriad details of a four dimensional battle in real time, and the ordnance suitable to destroy the missile and gun batteries. The acronym for neutering the anti-aircraft defenses is SEAD, Suppression of Enemy Air Defenses.

Under Sella's guidance, resources were marshaled, techniques were developed, and men were trained. A decade after the Yom Kippur War, an opportunity arose to put Sella's creation into operation. Israeli military operations in Lebanon were threatened by a vast array of Soviet supplied Syrian surface-to-air (SAM) batteries which had been deployed in the Bekaa Valley. Therefore, the Israelis commenced gathering information about this threat.

Radar signals emitted by the SAM tracking units had been carefully monitored and analyzed to determine frequencies, pulse repetition rates, beam

widths, sweep rates, and energy outputs. UAVs overflew the valley, low value targets which put no aircrew at risk, and imaged the positions of the missile batteries or caused the missile men to turn on their radars. Ferret aircraft, stationed out of harm's way, recorded the signals. The data was loaded into computers specially programmed to provide information, upon demand, to the battle commanders.

On the evening of June 8th, Syrian ground forces engaged the Israelis and Sella launched Operation Mole Cricket 19, the Bekaa Valley Campaign, June 9-11, 1982. The events are somewhat cloudy since the security conscious Israelis have been reticent about the tactics used and events which occurred but this is a reasonable reconstruction.

Mastiff UAVs overflew the valley causing the Syrians to light up their radars. These signals were relayed to Scout UAVs which in turn sent them to Grumman E-2C Hawkeyes and Boeing 707 Airborne Warning and Control (AWAC) aircraft

stationed outside of the battle area.

At that point, McDonnell-Douglas F-4 Phantoms, protected by F-16 Viper and F-15 Eagle top cover, attacked the sites with Shrike and Standard anti-radiation missiles. Anti-radiation missiles lock onto the active radars and home in on them. The attacking aircraft were also equipped with electronic counter-measure pods which transmitted signals which blinded or distorted the anti-aircraft radars which in turn rendered the missiles harmless.

The F-4s also launched Sampsons. Sampson is a glider developed by Brunswick Corporation for the USAF and known as the ADM-144 Tactical Air Launched Decoy Missile (TALD). It was license built in Israel. Sampson imitates the flight profile of a manned aircraft and serves as a missile decoy.

A specialized ground based anti-SAM missile, the Chachalit was also used. Chachalit is a booster equipped Shrike fired from a modified M4 Sherman tank.



The TALD in the foreground is a glider. The I-TALD in the rear is powered.

As the missile batteries were being taken out, the Syrians launched around 100 MiG -21, MiG-23, and Su-20 fighters in an attempt to disrupt the attack. UAVs circling over Syrian airfield spotted the Syrian aircraft taking off and relayed that information to the Hawkeyes.

The command and control system of the Syrian Air Force was based upon the Soviet model in which ground control interception intercept (GCI) officers directed the intercepting aircraft. The Israelis, knowing this, used ECM signals to jam the GCI transmissions, cutting off the Syrians from their commanders and Israeli AWAC aircraft positioned the Vipers and Eagles into optimum

attack positions. Once the Syrian aircraft passed outside of the protective curtain of Syrian based SAMs, the Israeli Air Force used radar guided Sparrows, heat seeking Sidewinders, and cannon against the oncoming enemy. What may have been the largest all-jet air battle in history erupted.

Two days later, when the smoke had cleared and a truce declared, Syria's Lebanon based ground forces, deprived of air support, had ceased to exist. Twenty-eight or more missile batteries had been destroyed and around 80 Syrian fighter planes had been shot down with no Israeli losses! To a great extent, this remarkable victory may be attributed to the information gathered by the unglamorous, slow, cheap, propeller driven drones fathered by Al Ellis and his colleagues. For his efforts, Ellis was awarded the Israel Defense Prize for "significant contributions to the defense of the State of Israel."

But Ellis did not abandon the world of drones. Upon his return to the United States in the mid-70s, he continued to build model aircraft and develop new drones. He worked on drone autopilot systems and was involved with Maryland's AAI Corporation, originally Aircraft Armaments Incorporated, in the development of the RQ-2 Pioneer. Pioneer was a spinoff of the Mastiff and IAI teamed with AAI in order to produce it for the USN and USMC. He also was involved with the Defense Advanced Research Projects Agency (DARPA) and the Sea Ferret. Sub launched drone.



USMC RQ-2B Pioneer at the Flying Leatherneck Museum

The development of relatively small drones, have found a wide range of uses by the military other than air forces.. The provide instant information to the ground soldier about what lies "on the other side of that hill." Naval forces find that their

handy size makes them suitable for launching and recovery aboard ships and their ability to get to altitude expands the ship's useful horizon making them useful for reconnaissance and shell spotting.

The first naval use occurred during Operation Desert Storm's Battle of Khafji. The battleship USS Missouri used Pioneers to spot the fall of its 16 inch gunfire.

In Israel, IAI and Tadiran consolidated their UAV divisions and formed a new corporate entity, Mazlat, which produced a line of successful successors to the original designs. Over the last eight years, airframes, electronics, and operating systems have brought in 4.6 billion dollars in revenue.

The utility and relatively low cost of the drones have made them extremely popular to cash strapped military. About 50% of the Israeli exports go to European nations, 35% to the Asian-Pacific market, and 10% to South American. The United States buys about 4%. Part of the Israeli success is due to their ability to optimize their products to satisfy the needs of the customer base.

L'Envoi

This essay barely touches upon the rich history of the UAV. The high altitude, long endurance and specialized supersonic reconnaissance aircraft such as Northrop-Grumman's Global Hawk and Lockheed's Mach 3 D-21 have not even been mentioned. The article concentrated on the light, propeller driven adjuncts to the battlefield which are the nearest relatives to the model planes of the hobbyist.

However, the story attempts to show how a few clever and dedicated individuals can be instrumental in introducing a technology which, when the time is ripe, provides novel and remarkable changes in the conduct of not only the military but also scientific researchers, emergency services providers and law enforcement agencies. Many may argue that some of these of these applications are neither moral nor justifiable but none can argue that the world is a different place with the arrival of the UAV.